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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,912	03/26/2004	Lih-Ping Li	67,200-1256	9403

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EXAMINER

MARKHAM, WESLEY D

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/810,912	LI ET AL.	
	Examiner	Art Unit	
	Wesley D Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claims 1 – 13 are currently pending in U.S. Application Serial No. 10/810,912, and an Office Action on the merits follows.

Drawings

1. The formal drawings (2 sheets, 3 figures) filed by the applicant on 3/26/2004 are acknowledged and approved by the examiner.

Specification

2. Applicant is reminded of the proper content of an abstract of the disclosure. The abstract should not refer to purported merits (i.e., that the method is a “novel method”, as recited in line 1 of the abstract) or speculative applications of the invention and should not compare the invention with the prior art.

Claim Objections

3. Applicant is advised that should Claim 6 be found allowable, Claim 7 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 11 – 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
6. Specifically, **Claims 11 – 13** depend from a non-existent claim (i.e., Claim 17). Therefore, it is impossible to determine the scope of the applicant's claimed invention, and Claims 11 – 13 are vague and indefinite. For the purposes of examination only, the examiner has reasonably interpreted Claims 11 – 13 to depend from Claim 10, a previous independent Claim.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969). A timely filed

terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b). Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. **Claims 1 and 2** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1, 9, and 16 of U.S. Patent No. 6,479,098 B1 (Yoo et al.). Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 1, 9, and 16 of U.S. Patent No. 6,479,098 B1 teach all the limitations of Claims 1 and 2 of the instant application (i.e., seasoning a process chamber by cleaning the process chamber and providing a seasoning film comprising an oxide-based material (i.e., FSG and USG) on the interior surfaces of the process chamber). Therefore, by performing the process recited in Claims 1, 9, and 16 of U.S. Patent No. 6,479,098 B1, one of ordinary skill in the art would have also performed the process of Claims 1 and 2 of the instant application, and as such, the process would have been obvious to one of ordinary skill in the art.
9. **Claims 1 and 2** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1, 10, and 18 of U.S.

Patent No. 6,042,887 (Chien et al.). Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 1, 10, and 18 of U.S. Patent No. 6,042,887 teach all the limitations of Claims 1 and 2 of the instant application (i.e., seasoning a process chamber by cleaning the process chamber and providing a seasoning film comprising an oxide-based material (i.e., silicon oxide) on the interior surfaces of the process chamber). Therefore, by performing the process recited in Claims 1, 10, and 18 of U.S. Patent No. 6,042,887, one of ordinary skill in the art would have also performed the process of Claims 1 and 2 of the instant application, and as such, the process would have been obvious to one of ordinary skill in the art.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Chien et al. (USPN 6,042,887).
12. Regarding **Claims 1 and 2**, Chien et al. teaches a method of seasoning a process chamber having interior surfaces, the method comprising the steps of (1) cleaning the process chamber, and (2) providing a seasoning film on the interior surfaces of

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the process chamber, wherein the seasoning film comprises an oxide-based material (Figure 3; Col.1, lines 8 – 16 and 59 – 67, Col.2, lines 1 – 11 and 25 – 37, Col.3, lines 3 – 6 and 59 – 67, Col.4, lines 1 – 33, and Col.6, lines 29 – 35).

13. Claims 1, 2, 5 – 7, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoo et al. (USPN 6,479,098 B1).
14. Regarding independent **Claims 1, 5, and 10**, Yoo et al. teaches a method of seasoning a process chamber, specifically a CVD chamber, having interior surfaces and gas inlets “positioned around the perimeter of the chamber body “12” and in the chamber lid “20”” (Figure 1, Col.1, lines 34 – 36), the method comprising the steps of (1) cleaning the process chamber, and (2) providing a seasoning film on the interior surfaces of the chamber and the gas inlets by introducing seasoning film precursor gases into the chamber (Abstract, Figures 1 – 2, Col.1, lines 8 – 67, Col.2, lines 1 – 21, 41 – 44, and 49 – 53, Col.3, lines 31 – 67, and Col.4, lines 1 – 55). Please note that the examiner has reasonably interpreted the “gas inlets positioned around the perimeter of the chamber body “12” and in the chamber lid “20”” in the CVD process and apparatus of Yoo et al. to be a, “gas distribution plate”, as required by Claims 5 and 10. Regarding **Claims 2, 6, 7, and 11**, Yoo et al. also teaches that the seasoning film comprises undoped silica glass (USG) (i.e., an oxide-based material, specifically silicon dioxide, as required by the claims) (Abstract, Col.2, lines 14 – 16, Col.3, lines 44 – 67, Col.4, lines 1 – 59).

15. Claims 1 – 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Qian et al. (USPN 6,136,211).
16. Regarding **Claims 1 – 4**, Qian et al. teaches a method of seasoning a process chamber having interior surfaces, the method comprising the steps of (1) cleaning the process chamber, and (2) providing a seasoning film on the interior surfaces of the process chamber, wherein the seasoning film comprises an oxide-based material (Claim 2), silicon nitride (Claim 3), or silicon carbide (Claim 4) (Abstract, Figure 2, Col.3, lines 44 – 60, Col.4, lines 41 – 45, Col.5, lines 61 – 67, Col.6, lines 1 – 13, Col.7, lines 12 – 18).
17. Claims 1 – 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Rossman et al. (USPN 6,121,161).
18. Regarding **Claims 1 – 3**, Rossman et al. teaches a method of seasoning a process chamber having interior surfaces, the method comprising the steps of (1) cleaning the process chamber, and (2) providing a seasoning film on the interior surfaces of the process chamber, wherein the seasoning film comprises an oxide-based material (e.g., doped silicate glass and/or SiO₂) (Claim 2) or silicon nitride (Claim 3) (Col.1, lines 13 – 24, Col.2, lines 5 – 63, Col.3, lines 3 – 32, Col.8, lines 54 – 67, and Col.9, lines 1 – 63).
19. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Gupta (USPN 5,824,375).

20. Regarding **Claims 1 and 2**, Gupta teaches a method of seasoning a process chamber having interior surfaces, the method comprising the steps of (1) cleaning the process chamber, and (2) providing a seasoning film on the interior surfaces of the process chamber, wherein the seasoning film comprises an oxide-based material (Abstract, Figures 1 and 4; Col.1, lines 13 – 67, Col.2, lines 1 – 20, 35 – 37, and 54 – 64, Col.3, lines 1 – 67, Col.4, lines 1 – 38, Col.8, lines 15 – 67, and Col.9, lines 1 – 3).

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
22. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

23. Claims 5 – 7, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta (USPN 5,824,375) in view of Yoo et al. (USPN 6,479,098 B1).
24. Regarding independent **Claims 5 and 10**, Gupta teaches a method of seasoning a CVD chamber having interior surfaces and a gas distribution plate “11” (Figure 1, Col.3, lines 51 – 54, Col.4, lines 29 – 30), the method comprising the steps of (1) cleaning the chamber, and (2) providing a seasoning film on the interior surfaces of the chamber by introducing seasoning film precursor gases into the chamber (Abstract, Figures 1 and 4; Col.1, lines 13 – 67, Col.2, lines 1 – 20, 35 – 37, and 54 – 64, Col.3, lines 1 – 67, Col.4, lines 1 – 38, Col.8, lines 15 – 67, and Col.9, lines 1 – 3). Gupta does not explicitly teach that the gas distribution plate “11” is coated with the seasoning film. However, the goal of Gupta in depositing the seasoning film is to block / reduce possible contamination (e.g., due to particles and residual fluorine in the chamber) in the chamber (Col.1, lines 36 – 62, Col.2, lines 13 – 15 and 54 – 64, Col.8, lines 26 – 31 and 64 – 67). Gupta teaches that this is done by depositing the seasoning film onto components and internal surfaces of the chamber forming the processing region (Col.1, lines 54 – 62), or in other words, the chamber components that are exposed to the process environment (Col.8, lines 53 – 57). Yoo et al. teaches an analogous method of depositing a seasoning film on the interior components / surfaces of a CVD chamber and teaches that the seasoning film should be deposited over all of the chamber processing region components, including the gas inlets, because all of the aforementioned components, including the gas inlets, are sources of contaminant material that

contaminate the processing environment and detrimentally affect the substrates processed therein (Col.1, lines 33 – 35 and 47 – 67, Col.2, lines 1 – 21, and Col.3, lines 44 – 67). Therefore, it would have been obvious to one of ordinary skill in the art to deposit the seasoning film of Gupta on all of the internal surfaces of the CVD chamber that form the processing region, including the gas distribution plate “11”, with the reasonable expectation of successfully and advantageously preventing undesired contamination in the chamber that originates from any of the internal surfaces of the CVD chamber, including the gas distribution plate, as taught by Yoo et al. In other words, one of ordinary skill in the art would have been motivated to deposit the seasoning film onto the gas distribution plate in the process / apparatus of Gupta in order to ensure that no contamination originates from the gas distribution plate, which forms part of the processing region on which the seasoning film is advantageously deposited in Gupta. Regarding **Claims 6, 7, and 11**, Gupta also teaches that the seasoning film comprises silicon dioxide (Col.8, lines 53 – 57).

25. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta (USPN 5,824,375) in view of Xi et al. (USPN 6,323,119 B1) or Rossman et al. (USPN 6,121,161).
26. Gupta teaches all the limitations of **Claim 3** as set forth above in paragraph 20, except for a method wherein the seasoning film comprises silicon nitride. Specifically, Gupta teaches a silicon oxide seasoning film (Col.8, lines 53 – 58). Xi et al. teaches that, in the art of depositing seasoning films on the inner surfaces of a

CVD reaction chamber to prevent contamination of the processing environment, the seasoning film can be FSG (i.e., fluorosilicate glass, or a silicon oxide based material) or silicon nitride (Col.3, lines 12 – 22, Col.4, lines 27 – 67, Col.11, lines 58 – 67, and Col.12, lines 1 – 16). In other words, Xi et al. teaches the functional equivalence of a silicon nitride seasoning film and a glass (i.e., oxide) based seasoning film, as taught by Gupta. Rossman et al. teaches that, in the art of depositing seasoning films on the inner surfaces of a CVD reaction chamber to prevent contamination of the processing environment, a silicon nitride seasoning film is preferable to a conventional seasoning film such as silicon oxide (as taught by Gupta) because the silicon nitride film has a lower diffusion rate for typical contaminants in relation to silicon oxide (Col.2, lines 25 – 63, Col.3, lines 16 – 32, Col.8, lines 54 – 67, and Col.9, lines 17 – 21). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a silicon nitride seasoning film as opposed to a silicon oxide seasoning film in the process of Gupta with, at the very least, the reasonable expectation of success and obtaining similar results (i.e., because Xi et al. teaches the functional equivalence of various seasoning films, including silicon nitride, in preventing CVD chamber contamination), or with the reasonable expectation of obtaining the advantages of using a silicon nitride seasoning film (as taught by Rossman et al.) as opposed to a silicon oxide seasoning film, such as more effectively preventing chamber contamination due to the low diffusion of contaminants through the silicon nitride seasoning film.

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27. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta (USPN 5,824,375) in view of Boeglin (USPN 5,061,514).

28. Gupta teaches all the limitations of **Claim 3** as set forth above in paragraph 20, except for a method wherein the seasoning film comprises silicon carbide.

Specifically, Gupta teaches a silicon oxide seasoning film (Col.8, lines 53 – 58).

However, Gupta also teaches that the seasoning step will typically be carried out according to the same process gas recipe to be used in a subsequently deposited

PECVD layer (Col.8, lines 58 – 67). Boeglin teaches that it was known in the semiconductor / microelectronics art (i.e., the art of Gupta) at the time of the

applicant's invention to deposit a silicon carbide layer on a wafer by plasma CVD

(i.e., PECVD) (Abstract, Col.1, lines 17 – 24, Col.2, lines 47 – 49, and Col.3, lines 1 – 12 and 55 – 66). Boeglin further teaches that, in a preferred embodiment, the

reaction chamber is prepared for film (i.e., silicon carbide) deposition by the preliminary step of passivating the chamber with a silicon carbide coating of the

invention (Col.3, lines 12 – 16). Therefore, it would have been obvious to one of ordinary skill in the art to deposit a silicon carbide seasoning film, as opposed to a

silicon oxide seasoning film (as taught by Gupta), on the occasion that a silicon

carbide film (as opposed to a silicon oxide film) is to be subsequently deposited on

a substrate / wafer in the plasma CVD chamber of Gupta because (1) Gupta

teaches that the seasoning step will typically be carried out according to the same

process gas recipe that is used in a subsequently deposited PECVD layer, and (2)

Boeglin supports this teaching by specifically teaching that, prior to depositing a

silicon carbide layer on a semiconductor substrate by PECVD in a chamber, the chamber should be coated with the same silicon carbide layer.

29. Claims 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta (USPN 5,824,375) in view of Yoo et al. (USPN 6,479,098 B1), in further view of Xi et al. (USPN 6,323,119 B1) or Rossman et al. (USPN 6,121,161).
30. The combination of Gupta and Yoo et al. teaches all the limitations of **Claims 8 and 12** as set forth above in paragraph 24, except for a method wherein the seasoning film comprises silicon nitride. However, depositing a silicon nitride seasoning film would have been obvious to one of ordinary skill in the art in light of the teachings of Xi et al. and/or Rossman et al. for the reasons set forth in paragraph 26 above.
31. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta (USPN 5,824,375) in view of Yoo et al. (USPN 6,479,098 B1), in further view of Boeglin (USPN 5,061,514).
32. The combination of Gupta and Yoo et al. teaches all the limitations of **Claims 9 and 13** as set forth above in paragraph 24, except for a method wherein the seasoning film comprises silicon carbide. However, depositing a silicon carbide seasoning film would have been obvious to one of ordinary skill in the art in light of the teachings of Boeglin et al. for the reasons set forth in paragraph 28 above .

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fong et al. (USPN 5,812,403) teaches a CVD chamber cleaning and seasoning method (Cols. 54 – 60). Sharan (USPN 6,756,088 B2) teaches a method of uniformly coating a gas distribution showerhead in a CVD device.

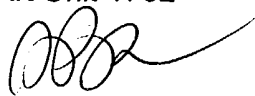
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


WDM

Wesley D Markham
Examiner
Art Unit 1762


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